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An Ambient Air Monitoring Survey
Near Killam, Alberta

prepared by

Air Quality Control Branch
Pollution Control Division
Environmental Protection Services
Alberta Environment

Edmonton, Alberta

September, 1985

Synopsis

The Pollution Control Division of Alberta Environment, in response to complaints of odours in the Killam area, carried out an ambient air monitoring survey in the vicinity of Voyager Petroleum Battery, Premier Resources gas plant and the Keles Battery from July 4, 1984 to September 25, 1984. A trailer equipped to monitor hydrogen sulphide (H_2S) and wind was located approximately one kilometer north-east of the Premier Resources gas plant at SW 16-42-13-W4M (Figure 1). The ambient monitoring trailer was also equipped to measure sulphur dioxide (SO_2) during the months of August and September, 1984.

The results of the ambient air monitoring survey in the Killam area were:

1. The maximum monitored levels of both H_2S and SO_2 were in total compliance with the maximum permissible levels specified in the Alberta Clean Air (Maximum Levels) Regulations.
2. There did not appear to be any significant correlation between wind direction and percent of winds resulting in pollutant readings.

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1. Introduction

In response to complaints of odours in the area of Killam, Alberta, the Air Quality Control Branch of the Pollution Control Division, Alberta Environment carried out an ambient air monitoring survey in the vicinity of the Voyager Petroleum Battery, the Premier Resources gas plant and the Keles Battery from July 4, 1984 to September 25, 1984. An air monitoring trailer, equipped to monitor hydrogen sulphide (H_2S) and wind was located at the Vern Coates residence (SW 16-42-13 W4M) in July (Figure 1). Starting in August, the monitoring capability was expanded to include sulphur dioxide (SO_2). Assessment of the air quality was based upon a comparison of the monitored data with the Alberta Clean Air (Maximum Levels) Regulations.

This report constitutes a summary and analysis of the data, and conclusions drawn from that analysis. The data are presented in the form of monthly averages and are illustrated on wind and pollution roses.

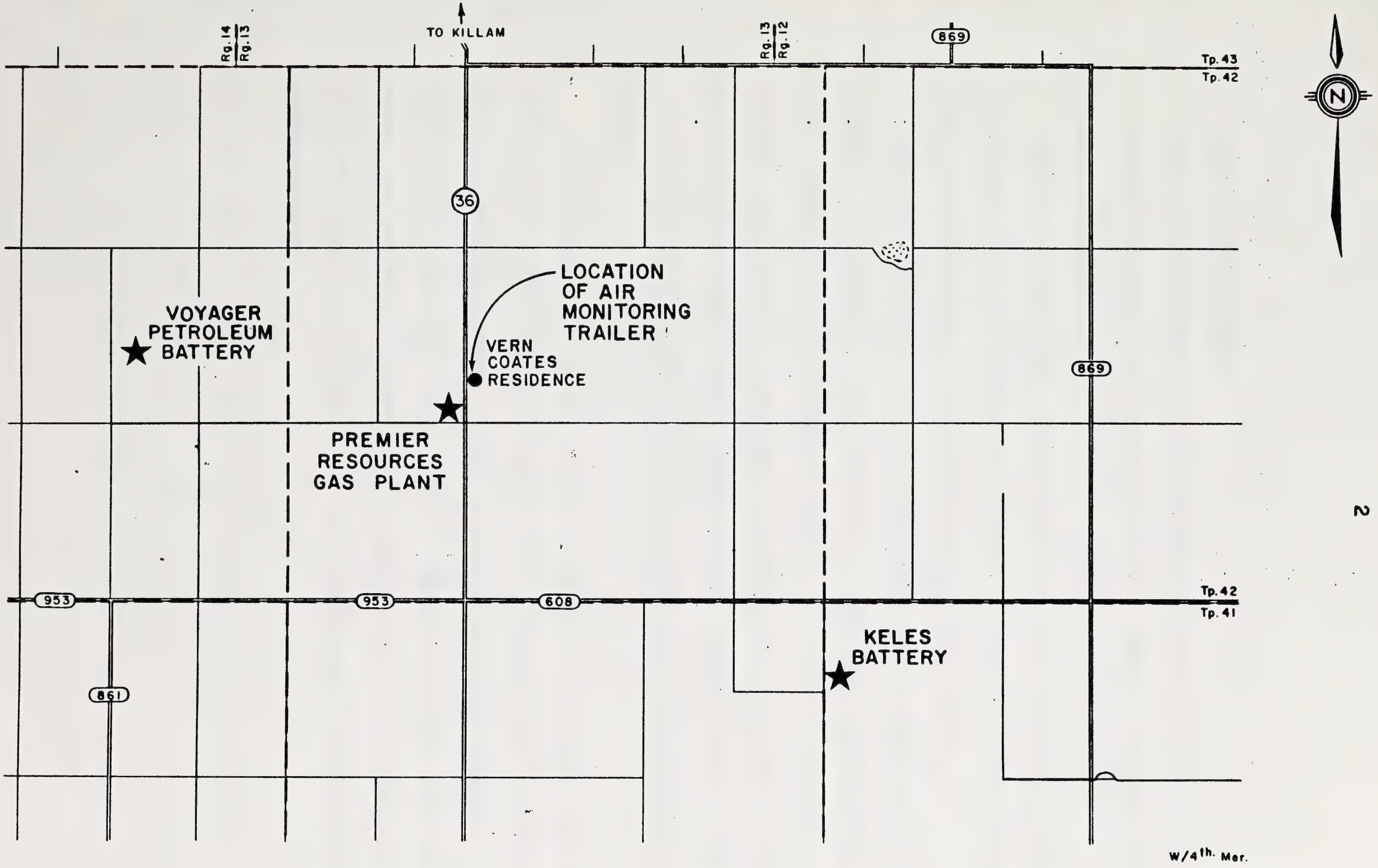

FIGURE I. LOCATION OF AIR MONITORING TRAILER - KILLAM

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2. Results and Discussion

Tables 1 to 3 summarize the data collected during the period of the air monitoring survey. The 1-hour and 24-hour levels of both H_2S and SO_2 were in total compliance with the Maximum Levels Regulations.

South-east winds, which predominated during the monitoring period, accounted for 17.00% of total wind activity (Table 3). North-west winds were second in frequency with 14.33% of total wind activity.

There did not appear to be any significant correlation between wind direction and percent of winds resulting in pollutant readings (Figures 2 and 3, bottom right-hand pollution roses). In the case of hydrogen sulphide, the strongest correlation was with south-east winds, (1.87%), and south-west winds (1.60%). Sulphur dioxide readings showed a 2.43% correlation with south-west winds and a 1.55% correlation with southerly winds.

Stronger correlations were evident, however, between wind direction and percent of pollutant readings with wind (Figures 2 and 3, bottom left-hand pollution roses). A total of 24.20% of all H_2S readings occurred with south-west winds, while 22.29% occurred with south-east winds. Over 34% of all sulphur dioxide readings were associated with south-west winds, and 22.22% of all SO_2 readings were associated with southerly winds.

Table 1
SUMMARY OF HYDROGEN SULPHIDE READINGS, VERN COATES RESIDENCE - KILLAM JULY, 1984 - SEPTEMBER, 1984

MONITORING PERIOD	ARITHMETIC MEAN (ppm)	PERCENT OF TIME INSTRUMENT OPERATIONAL	PERCENT COMPLIANCE WITH REGULATIONS	
			1-HOUR	24-HOUR
July, 1984	0.000	91.7	100	100
August, 1984	0.000	92.9	100	100
September, 1984	0.000	94.5	100	100
July-September, 1984	0.000	93.0	100	100

Table 2
SUMMARY OF SULPHUR DIOXIDE READINGS, VERN COATES RESIDENCE - KILLAM AUGUST, 1984 - SEPTEMBER, 1984

MONITORING PERIOD	ARITHMETIC MEAN (ppm)	PERCENT OF TIME INSTRUMENT OPERATIONAL	PERCENT COMPLIANCE WITH REGULATIONS	
			1-HOUR	24-HOUR
August, 1984	0.000*	63.4	100	100
September, 1984	0.000	93.0	100	100
August-September, 1984	0.000	78.2	100	100

*Instrument operational less than 75%; monthly mean may not be representative.

TABLE 3

FREQUENCY DISTRIBUTION OF WIND
KILLAM
JULY - SEPTEMBER, 1984

MONITORING PERIOD	Calm	N	NE	E	SE	S	SW	W	NW	% of Time Instrument Operational
July, 1984	0.74	6.55	0.60	3.27	9.82	4.61	2.23	3.87	7.44	39.14
August, 1984	3.23	6.85	1.21	3.09	15.99	10.08	4.44	12.23	18.55	75.67
Sept. 1984	7.85	19.20	8.18	6.18	21.20	12.52	4.17	5.01	13.36	97.66
July - Sept. 1984	4.68	11.91	3.98	4.40	17.00	10.07	3.92	7.68	14.33	77.98

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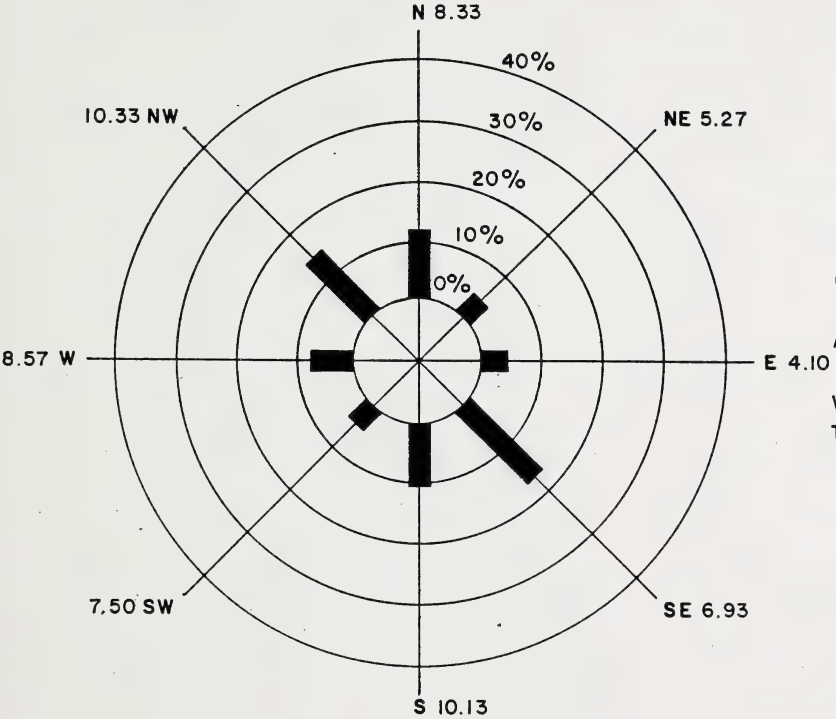
FIGURE 2 CORRELATION OF WIND WITH HYDROGEN SULPHIDE (H_2S) READINGS AT THE VERN COATES RESIDENCE, KILLAM JULY 4, 1984 - SEPTEMBER 25, 1984

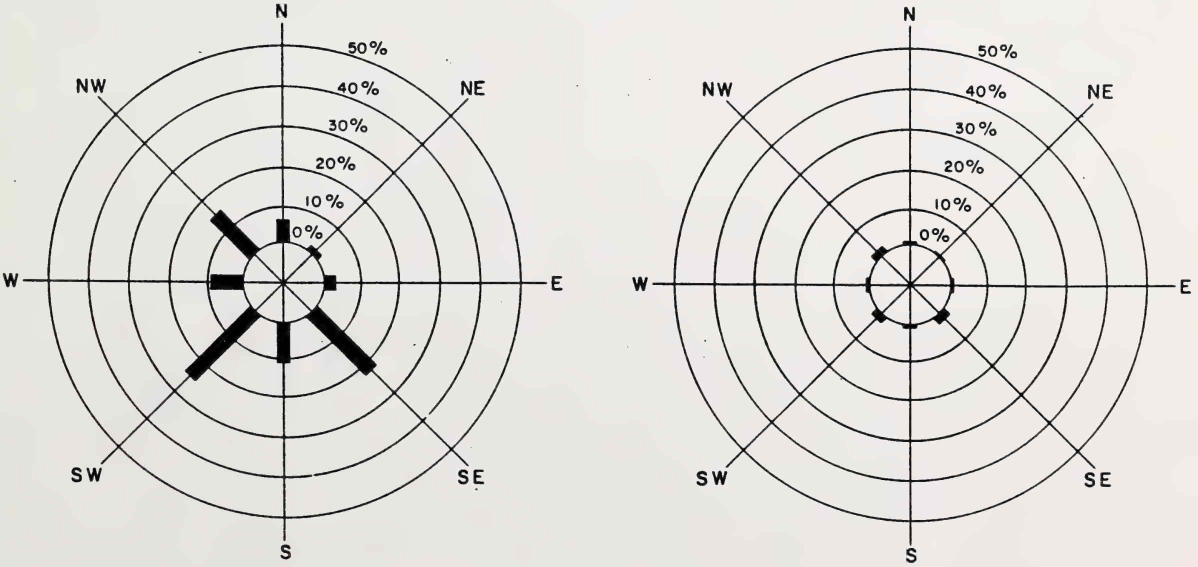
WIND ROSE



Calm Conditions 4.68 %

Average Wind Speed 8.27 Km/h

Wind Speeds Are Shown At The Outer Circle



PERCENT OF H_2S READINGS WITH WIND

PERCENT OF WINDS RESULTING IN H_2S READINGS

7.64 % of H_2S Readings Recorded With Calm Conditions

0.64 % of Calm Winds Resulted in H_2S Readings

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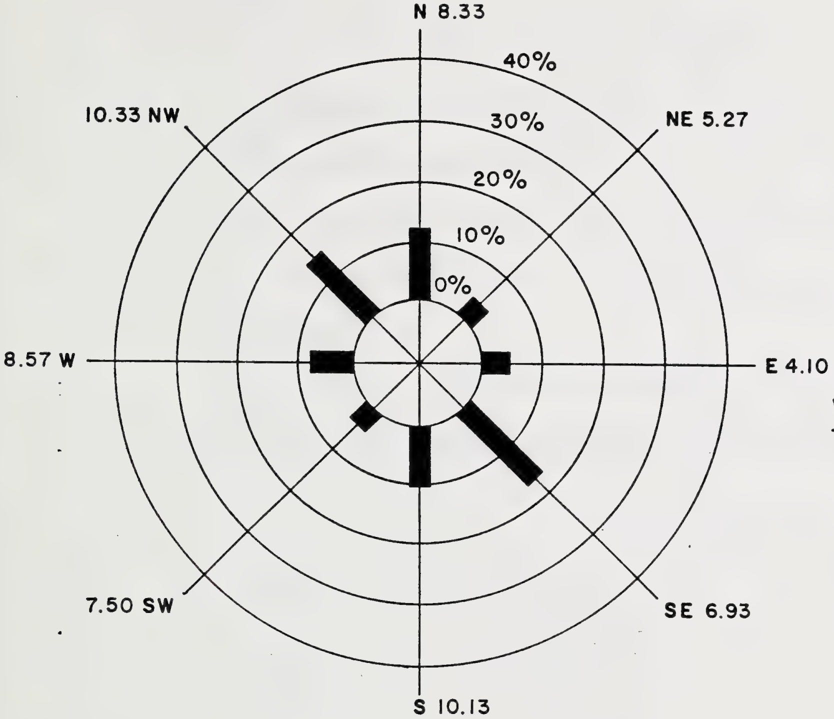
FIGURE 3 CORRELATION OF WIND WITH SULPHUR DIOXIDE (SO_2) READINGS AT THE VERN COATES RESIDENCE, KILLAM JULY 4, 1984 - SEPTEMBER 25, 1984

WIND ROSE

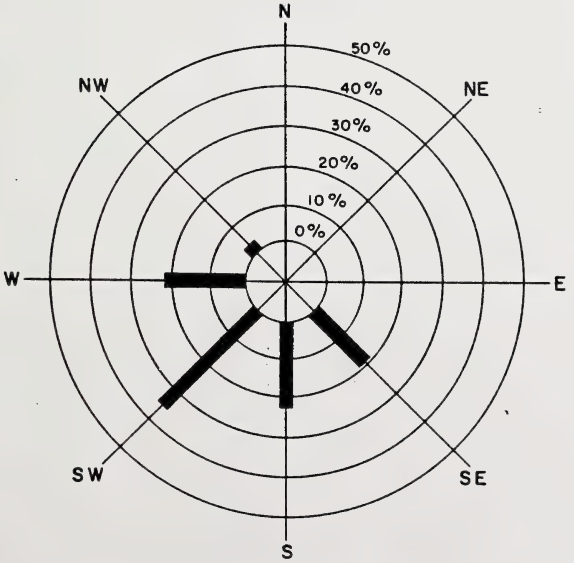


Calm Conditions 4.68 %

Average Wind Speed 8.27 Km/h

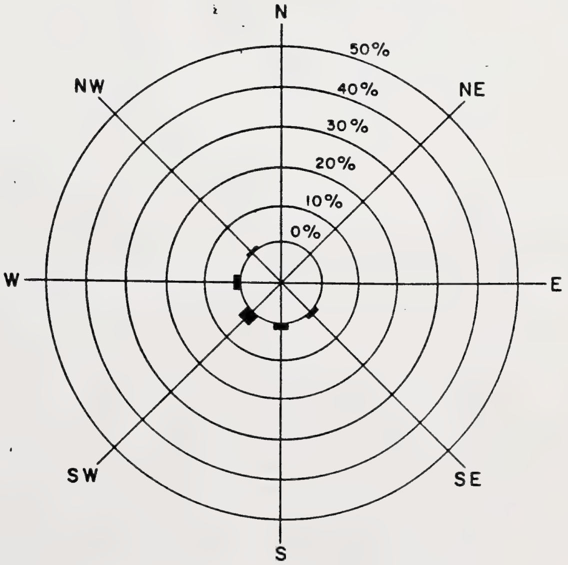
Wind Speeds Are Shown At The Outer Circle

PERCENT OF SO_2 READINGS WITH WIND



0.00 % of SO_2 Readings Recorded With Calm Conditions

PERCENT OF WINDS RESULTING IN SO_2 READINGS



0.00 % of Calm Winds Resulted in SO_2 Readings

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3. Conclusions

The results of the ambient air monitoring survey in the Killam area from July to September, 1984 led to two conclusions:

1. The maximum monitored levels of both hydrogen sulphide (H_2S) and sulphur dioxide (SO_2) were in total compliance with the maximum permissible levels specified in the Alberta Clean Air (Maximum Levels) Regulations.
2. There did not appear to be any significant correlation between wind direction and percent of winds resulting in pollutant readings.

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